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The impact of air pollution on the development of asthma in the population of the city of Kazan, Republic of Tatarstan

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Abstract

Analysis of the incidence of asthma in all adult and child population of the city of Kazan showed that the incidence rates in Kazan significantly exceed the national level, and there has been a reliable increase in the incidence of bronchial asthma in Kazan population over the past five years. According to the results of factor analysis of the causes of increasing incidence of asthma, air pollution takes one of the first rank places. We have analyzed the concentration of major pollutants contained in the atmosphere and affecting the incidence of respiratory diseases: suspended solids (total, and fractions PM10 and PM2.5), nitrogen dioxide, soot, formaldehyde, and ammonia. We have calculated hazard ratios (HR) for these substances, showing the presence of the risk of morbidity based on the concentration of the pollutant. Concentrations of PM10 and PM2.5 in the atmosphere of the city of Kazan significantly exceed the WHO-recommended concentration (3.9 times in 2010 to 2.9 times in 2015 for PM10, and 4.3 times in 2010 to 3.2 times in 2015 for PM2.5). That is, the hazard ratios (HR) ranged from 4.3 to 3.2. Hazard ratios for nitrogen dioxide, soot, and particulate matters significantly exceed unity, i.e., they pose the risk of incidence of the respiratory diseases.

Keywords

Bronchial asthma, Morbidity, Nitrogen dioxide, Particulate matters, Sources of air pollution